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TITLE OF INVENTION : DRY BATTERY EQUIPPED WITH COLOR TIMER

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NUMBER OF INVENTIONS : One

REQUEST FOR EXAMINATION : None

1. Title of invention

DRY BATTERY EQUIPPED WITH COLOR TIMER

2. Claim

Dry battery equipped with color timer, which has on its surface a sensor that will change its color with the time of its usage.

3. Specification

[Field of commercial utility]

This invention relates to dry battery equipped with color timer, that can tell the life of the dry battery and can be used easily in ordinary household.

[Prior art]

With ordinary dry battery of the prior art, one can not tell whether the battery is new or used. If one wants to find out, instrument such as a tester is needed.

[Problems to be solved by the invention]

With the dry battery of the prior art, it was not possible to tell how much of the battery had been consumed. As a result, often the battery was used in an inefficient manner. For example, a new dry battery was often paired with an old battery, or a still viable dry battery was replaced by a new battery. This invention was made to solve this problem. The objective of this invention is to provide a dry battery equipped with color timer, so that the extent of its consumption can be learned by visual examination.

[Means to solve the problems]

To solve the afore-said problems, this invention has added a sensor, which can change its color with the time, on the surface of the battery.

[Function]

In this invention, efficient utilization of the battery is made possible by addition of the afore-said function to the dry battery so that the extent of consumption of the dry battery can be learned immediately.

Example

An embodied example of the dry battery equipped with color timer of this invention is explained in the following, by referring to the accompanying drawings. Fig. 1 is a cross-sectioned view of the dry battery having color timer of this invention. In Fig. 1, 1 is the main unit of the dry battery, 2 a surface sensor to indicate the extent of usage, 3 a transparent coated film, 4 the holes to release oxygen generated from use, 10 a negative electrode, and 11 is a positive electrode. 2 is a copper sulfate solution which was formed as a gel and has an extremely low resistivity. The copper ion which is the cation in the sensor 2 to indicate the extent of usage is attracted to the negative electrode of the main unit 1 of the dry battery, to become copper. Fig. 3 is a magnified view of the negative electrode 10. In Fig. 3, 50 is the copper adhered onto the negative electrode. If the main unit 1 of the dry battery is still new, the copper ion 2 will be in blue color. As the battery 1 is used, the color will change gradually to reddish copper color near the negative electrode. The extent of usage of the battery can be determined by quantifying the extent of the change of color to this reddish copper color. Fig. 4 is a front view of the negative electrode 10 shown in Fig. 1. The front of the negative electrode is blue. The effect of voltage depression caused by the sensor 2 to indicate the extent of usage is held down as much as possible by making the layer of the sensor 2 near the positive electrode 11 and the negative electrode 10 extremely thin. Therefore, the outside closest to the thicker layer of the sensor 2 will have a higher chance of contacting with the copper ion. In this area, the reaction of converting the copper ion into elementary copper will start first. Therefore, change of color to reddish copper color will take place, starting from the outside. One can measure the rate of color change, and the result can be quantified, by using its relationship to the life of the battery. 101 in this diagram shows the scale which is created based on the data acquired by such quantitative investigation, and the number written on the scale indicates the remaining time that the battery is still useful. It also shows that the battery is no longer useful when the reading on the scale reaches 0. Now, in Fig. 1, since oxygen is generated at the positive electrode of the dry battery unit 1 during its use, many holes to release oxygen 4 are provided on the surface of the positive electrode.

Fig. 2 is another embodied example of this invention. In Fig. 2, 5 is a material sensor which changes its color based on the amount of electricity that has passed through this sensor material. 5 is a conductor, and the color caused by passage of electricity will remain there on the sensor.

[Effect of invention]

As explained above, the dry battery of this invention that can tell the extent of usage will have an extremely high degree of efficiency of application.

4. Brief explanation of drawings

Fig. 1 is a cross-sectioned view of an example of the dry battery equipped with color timer of this invention, Fig. 2 is a view to illustrate another embodied example of this invention, Fig. 3 is an enlarged view of 10 which is illustrated in Fig. 1, and Fig. 4 is a view to illustrate an exmaple of quantification of the degree of color change.

1.....Dry battery proper, 2.....sensor to show the extent of usage, 3.....coted film, 4.....oxygen release hole, 5.....material sensor, 10.....negative electrode, 11..... positive electrode, 50.....precipitated copper, 101..... a scale to indicate the extent of usage.

Fig. 1

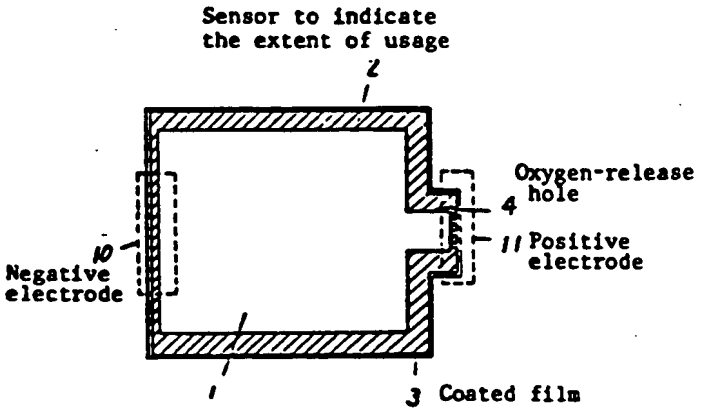

Fig. 2

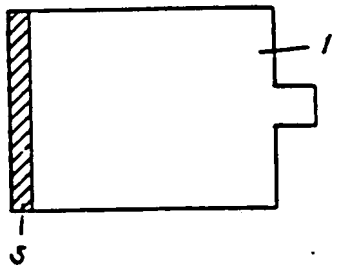

Fig. 3

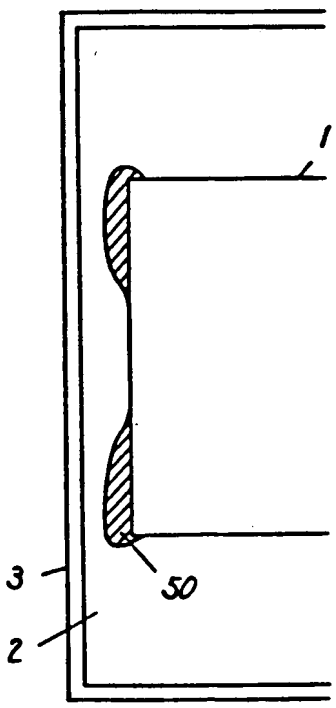

Fig. 4